ANNEX Q

HAZARDOUS MATERIALS
&
OIL SPILL RESPONSE

CITY OF HOUSTON

APPROVAL AND IMPLEMENTATION

Annex Q

Hazardous Materials &
Oil Spill Response

ANNEX REDACTED – DATA REMOVED

RECORD OF CHANGES

Annex Q

Hazardous Materials &
Oil Spill Response

Change #	Date of Change	Entered By	Date Entered

TABLE OF CONTENTS

ANNEX Q

HAZARDOUS MATERIALS & OIL SPILL RESPONSE

I. AUTHORITY

See City of Houston Basic Plan.

The organizational and operational concepts set forth in this annex are promulgated under the following authorities:

A. Local

See City's Basic Plan

B. State

1. Hazard Communication Act, Title 83, Article 5182b
2. Texas Hazardous Substances Spill Prevention and Control Act, Chapter 26, Subchapter G, Texas Water Code
3. State Solid Waste Disposal Act, Texas Civil Statutes Article 477-7

C. Federal

1. Federal Civil Defense Act of 1950, PL 81-920 as amended
2. Comprehensive Environmental Response Compensation and Liability Act of 1980, PL 96-510 (CERCLA or "Superfund")
3. Clean Water Act (Section 31 or USC 1251)
4. Resource Conservation and Recovery Act (RCRA)
5. Superfund Amendments and Reauthorization Act of 1986; Title III: The Emergency Planning and Community Right to Know

II. PURPOSE

A. The purpose of this annex is to establish guidelines under which the City will operate in the event of a hazardous material incident.

B. It defines the roles, responsibilities and inter/intra organizational relationships of government and private entities in response to a hazardous material incident.

C. It provides guidance to protect the population and the environment from a hazardous material incident.

III. EXPLANATION OF TERMS

A. Acronyms

CAER	Community Alert & Emergency Response
CEC	Community Emergency Coordinator
CHEMTREC	Chemical Transportation Emergency Center
EPCRA	Emergency Planning, Community Right-to-Know Act of 1986
FOSC	Federal On-Scene Coordinator

HMRT	Hazardous Material Response Team
ICP	Incident Command Post
LEPC	Local Emergency Planning Committee
ME	Medical Examiner
METRO	Harris County Metropolitan Transit Authority
P&R	Houston's Parks & Recreation Department
PIO	Public Information Officer
PW&E	Houston's Public Works & Engineering Department
RP	Responsible Party
RACES	Radio Amateur Civil Emergency Services
SOSC	State On-Scene Coordinator
SWM	Houston's Solid Waste Management Department
TDH	Texas Department of Health
TGLO	Texas General Land Office
TCEQ	Texas Commission of Environmental Quality
TRC	Texas Railroad Commission
TxDOT	Texas Department of Transportation
USCG	United States Coast Guard

B. Definitions

Refer to Appendix 3 of this annex.

IV. SITUATION AND ASSUMPTIONS

A. Situation

1. Hazardous materials are commonly used, transported and produced in the City; hence, hazardous materials incidents may occur as the result of natural disasters, human error or accident or terrorist acts.

    a. Radiological accidents or incidents are covered in the City's Annex D (Radiological Incidents).

    b. Hazardous Materials incidents resulting from terrorist activity to include the use of weapons of mass destruction (nuclear, biological, or chemical agents) are covered in the City's Annex V (Terrorist Incident Response).

2. The Houston Fire Department's (HFD) Hazardous Materials Response Team (HMRT) will have, to the extent possible, the capability to make protective responses in the event of an incident involving the transportation of, the storage of, the usage of or manufacturing of hazardous materials.

3. The resources of industry, environmental consultants, emergency response companies, local, state or federal governments, separately or in combination, may be required to effectively manage the situation.

4. Within the City, areas subject to risk from hazardous materials are identified in the City's Risk Assessment and Vulnerability Analysis (RAVA) 2000. A copy is located in the OEM.

5. Information on pipelines, toxic release inventories (TRI), risk management plan (RMP) facilities and Tier II sites is maintained by the Houston LEPC and entered into the HFD dispatch database. Refer to Appendix 4 for maps.

6. Transportation routes for hazardous materials cargo were established by local ordinance. Refer to the City's Code of Ordinances (Chapter 45, Article III, Sections 45-56, 57, 58. Ordinances 70-280 dated 03-04-70 and 76-2098 dated 12-07-76 apply. Refer to Appendix 5 for maps.

7. Evacuation routes should be determined by the Incident Commander and disseminated to the residents in the affected area.

B. Assumptions

1. The existence of fixed hazardous materials facilities provide the potential for an episodic air release with the possibility of being hazardous to the populous located within the proximity of each fixed hazardous materials facility.

2. Protective actions include in-place sheltering, evacuation, and notification of any environmental contamination.

3. The amount of time available to determine the scope and magnitude of the incident (i.e., lead-time) will impact the recommended protective actions.

4. In the event of a hazardous material incident, many of the residents in the vulnerable zone may choose to evacuate spontaneously without official recommendation. Many may leave by way of routes not designated as main evacuation routes.

5. In the event of an evacuation, some of the populace may relocate to private homes or hotel/motel facilities. For planning purposes, congregate sheltering is addressed in the City's Annex C (Shelter/Mass Care).

6. A transportation incident involving hazardous materials may require the evacuation of the public at any location within the City.

7. Hazardous Materials entering the wastewater (sanitary sewers, lift stations and/or treatment plants) systems may necessitate the shutdown of the affected system or its components which may result in the release (bypass) of untreated wastewater. Hazardous Materials entering the stormwater system (storm sewers, roadside ditches, off-road ditches, Harris County Flood Control ditches, streams and bayous) may require containment to prevent or otherwise restrict further downstream flow.

8. Wind shifts may occur that result in changes in protective action measures.

V. CONCEPT OF OPERATIONS

A. General

This annex will become effective during any situation in which there is a danger to life, health, property or the environment as a result of an accident involving the uncontrolled release or spill of any hazardous materials. The primary agencies involved will be the City's Fire and Police Departments (HFD and HPD), assisted by other City departments as appropriate. The extent of the hazard and circumstances involved may require the activation of the Emergency Operations Center (EOC) to the degree described in the City's Annex N (Direction and Control) and full disaster response from city agencies and outside organizations as outlined in the EMP.

Depending upon the seriousness of the incident, protective actions could include sheltering in-place, evacuation and notification of other appropriate agencies.

The Incident Commander (IC) will direct and control all on-site operations involving hazardous material emergencies that may include estimating the areas and population affected by a hazardous materials release and provide warning to and implementation of protective actions for the public in the immediate vicinity of the incident site. In case of a major emergency, the IC may request assistance from Houston's Office of Emergency Management (OEM) to provide necessary support.

B. Incident Classification

The HFD classifies the response to hazardous materials into two basic categories:

1. First Responder Operations – those events of a hazardous materials nature that can typically be resolved by First Responders without the intervention of a hazardous materials response team.

2. Hazardous Materials Incident - those events of a hazardous materials nature that cannot typically be resolved by First Responders and require the intervention of a hazardous materials response team.

Several response action strategies are available to protect the public. These are discussed in detail in Appendix 2.

C. Reporting

1. First responders arriving upon a scene where hazardous materials are found to be involved will immediately notify their dispatcher and provide the following information insofar as possible:

    a. Location of accident
    b. Type of material involved
    c. Extent of injuries and damage
    d. Estimate of need for ambulances
    e. Estimate of vehicles needed for anticipated area evacuation
    f. The actions being taken

2. In the event the initial report is through police radio channels, the HPD dispatcher will immediately pass the above information to the HFD dispatcher.

3. **Special Statement:** ***IF THE SITUATION OBVIOUSLY REQUIRES IMMEDIATE ACTION TO ISOLATE THE AREA OR TO EVACUATE NEARBY RESIDENTS OR BUILDING OCCUPANTS, i.e., IF THERE IS IMMINENT DANGER OF EXPLOSION OR RELEASE OF TOXIC GAS, THE FIRST OFFICER ON THE SCENE (EITHER FIRE OR POLICE) SHOULD RECOMMEND EVACUATION IMMEDIATELY. Adjustment of the evacuation zone can be made later after the senior fire official arrives on the scene.***

4. Notification

   a. Upon notification of an incident involving hazardous materials, the HFD dispatcher will:

      1) Dispatch the HMRT and other appropriate fire companies.

      2) Notify the following departments if the situation warrants:

         a) OEM

         b) HPD

D. Determining Affected Areas and Protective Actions

1. The Incident Commander shall estimate areas and population affected by a hazardous materials release, and may be assisted by the EOC in that process. Aids for determining the size of the area affected may include:

   a. The Emergency Response Guidebook

   b. Computerized release modeling (CAMEO/other software)

   c. Assistance by the responsible party

   d. Assistance by expert sources such as CHEMTREC or CHEM-TEL

   e. Assistance by state and federal agencies

2. The Incident Commander shall determine required protective actions for response personnel and the public, and may be aided in determining protective actions for the public by the EOC. See Appendix 3 for emergency responder safety considerations. See Appendix 4 for public protective action information.

3. The Incident Commander will typically provide warning to and implement protective actions for the public in the immediate vicinity of the incident site. The EOC will normally oversee dissemination of warning and implementation of protective actions for the public beyond the immediate incident site and related activities such as traffic control and activation of shelters. Sample public warning and protective action messages are provided in the City's Annex A (Warning). Additional information on

public information is provided in the City's Annex I (Emergency Public Information).

E. Phases of Management

1. Mitigation
   a. Develop inspection guidelines
   b. Conduct site inspections
   c. Enforce current Uniform Fire Codes and other City Codes
   d. Designate hazardous cargo (HC) routes

2. Preparedness
   a. Conduct public orientation/education programs
   b. Provide for training for all emergency response personnel
   c. Identify resources (Contractors and specialized equipment)
   d. Develop management and recovery guidelines

3. Response
   a. Determine hazard potential
   b. Initiate protective actions to protect life, property and the environment
   c. Contain and control the hazard

4. Recovery
   a. Monitor/survey to declare area safe
   b. Coordinate the removal of contaminants
   c. Document event

VI. ORGANIZATION & ASSIGNMENT OF RESPONSIBILITIES

A. Organization

1. See City's Basic Plan.

2. Effective response to a hazardous materials incident or oil spill may also require response assistance from the responsible party (RP) for the spill and, in some situations, by state and federal agencies with responsibilities for hazardous materials spills.

B. Assignment of Responsibilities

Task Assignments

1. Community Emergency Coordinator (CEC)

   Is appointed by the LEPC and meets all requirements under EPCRA.

2. HFD

a. The first fire department officer arriving on the scene:

1) Assume duties of IC until relieved by a higher-ranking fire officer.

2) Establish an Incident Command Post (ICP) and determine the safest approach route (either up-wind or crosswind).

3) Take immediate steps to identify the hazardous material and report to HFD dispatch.

4) Develop and initiate a plan of action appropriate to the situation, in accordance with HFD procedures.

b. The HMRT will:

1) Identify the hazardous material if possible and determine its hazards and any appropriate action(s) to be taken to manage the incident.

2) Confine or contain the hazardous material to the smallest area possible.

3) Stabilize the emergency, extinguish fire or stop further release of the hazardous material.

4) Serve as an advisor to the IC.

5) Decontaminate victims, personnel, equipment and facilities as outlined in HFD's Standard Operating Guidelines (SOG).

3 HPD

The senior police officer at the incident scene will report to the ICP and:

a. Initiate evacuation of persons from the danger area when requested to do so by the IC. Inform OEM representative as soon as possible regarding the evacuation.

b. Cordon off access to the scene and restrict entry by unauthorized personnel. Entry by non-emergency personnel will be permitted on the basis of officer judgment or proper identification.

c. Provide appropriate care of bodies until the Medical Examiner (ME) arrives.

d. If necessary, have a member of HPD Environment Crime Unit report to scene.

6. OEM

a. When requested, an OEM representative will respond to the scene and report to the ICP.

b. Inform the Emergency Management Coordinator (EMC) of the significant happenings and brief the EMC on current status, scope of the problem, impact of the event, and estimated time the incident will be terminated with all operations being completed.

c. Determine if use of the Emergency Alert System (EAS) is required and/or press briefings are need to keep the public informed. Coordinate with HFD and other Department PIO representatives before any releases are forwarded to the media.

d. Coordinate efforts of volunteer groups in relocating, sheltering and feeding evacuees.

e. When the IC recommends evacuation, coordinate the evacuation operations through the EOC. See the City's Annex E (Evacuation) for evacuation information.

f. Coordinate with other City departments and outside agencies as required.

5. ARC and TSA

See the City's Annex C (Shelter & Mass Care).

6. Recommended roles of transportation shippers and fixed facility operators of Hazardous Materials within the Incident Command System (ICS)

a. Designate a facility emergency coordinator to be assigned to the ICP

b. Implement facility contingency plan

c. Provide technical support to IC

d. Provide post planning support for dealing with contingency planning to include Risk Management plans

e. Provide expertise to the EOC

f. Provide emergency service representative (fire brigade) to the ICP

g. Provide public information representative to the ICP

h. Provide the public alert system (**C**ommunity **A**lert & **E**mergency **R**esponse-**CAER**) so public notifications can be made to the community area falling within the vulnerable zone

7. State Agencies with responsibility include:

a. Texas Division of Emergency Management (DEM)

b. Texas Commission of Environmental Quality (TCEQ)

c. Texas Department of Public Safety (DPS)

d. Texas Railroad Commission (TRC)

e. Texas Department of Transportation (TxDOT)

f. Texas General Land Office (TGLO)

8. Federal Agencies with responsibility may include the Environmental Protection Agency (EPA), Federal Emergency Management Agency (FEMA) and the US Coast Guard (USCG) that may respond to certain hazardous materials incidents and oil spills when required by federal environmental protection plans or requested to do so by the State.

C. Relationship to Other Plans

1. See the City's Basic Plan.
2. The HFD's HMRT SOG establish operational concepts and activities for team activation, assessment, personnel safety, site control, identification containment, command post, staging areas, monitoring, on-site/off-site response coordination and recovery.
3. Acutely Toxic Chemical Fixed Facility Contingency Plan. Each fixed facility having acutely toxic chemicals is required to develop on on-site contingency plan that specifies notification, emergency response organization and responsibilities; emergency response organization procedures and coordination procedures for interfacing with off-site authorities and response organizations.

VII. DIRECTION & CONTROL

See the City's Basic Plan

VIII. READINESS LEVELS

A. See the City's Basic Plan.

B. The HFD has a trained HMRT in readiness 24 hours a day for immediate response. Increased readiness actions are outlined in detail in the HFD SOG.

IX. ADMINISTRATION AND SUPPORT

A. Support

See the City's Basic Plan.

B. Documentation and Investigative Follow-up

1. The fixed site facility is responsible for documentation of accidental releases and preparing the following:
    a. Fixed site version of the incident including time, cause of spills, material and quantity released, location, response actions, etc.
    b. Chronological log that details a minute-by-minute account of spill response activities, e.g., emergency response team activation, notification of off-site authorities, significant changes in situation, time of recommendations to off-site authorities, etc.
2. The on-scene HFD hazardous materials Officer is responsible for preparing an event log that summarizes the incident including cause of incident, incident critique, damage assessment and conclusion.

C. Resources, Training and Exercises

See the City's Basic Plan.

X. ANNEX DEVELOPMENT & MAINTENANCE

The Fire Chief will be responsible for the development and maintenance of this Annex. This annex will be reviewed annually and will be updated per section 1.4.4 of the Basic Plan.

APPENDICES

APPENDIX 1 TO ANNEX Q

GLOSSARY

Definitions

1. Accident Site: The location of an unexpected occurrence, failure, or loss, either at a facility or along a transport route, resulting in a release of listed chemicals.

2. Acute Exposure: Exposures that occur for relatively short periods of time, generally hours to 1-2 days.

3. Acutely Toxic Chemicals: Chemicals which can cause both severe short- and -long-term health effects after a single, brief exposure (short duration). These chemicals can cause damage to living tissue, impairment of the central nervous system, severe illness or in extreme cases, death when ingested, inhaled, or absorbed through the skin.

4. CHEMTREC: The Chemical Emergency Transportation Center (CHEMTREC) is a centralized toll free telephone service advice on the nature of the product and steps to be taken in handling the early stages of transportation emergencies where hazardous chemicals are involved. CHEMTREC promptly contacts the shipper of the material involved for more detailed information and appropriate follow-up action including on-scene assistance when feasible.

5. CHLOREP: The Chlorine Emergency Plan (CHLOREP) was established by the Chlorine Institute to enable the nearest producer of chlorine products to respond to an accident involving chlorine. CHEMTREC serves as the communications link for this program.

6. Contingency Plan: A document developed to identify and catalog all the elements required to respond to an emergency, to define responsibilities and specific tasks, and to serve as a response guide.

7. Exclusion Zone: Is the area where contamination does or could occur.

8. Fixed Facility: A plant site where handling/transfer, processing, and/or storage of chemicals is performed.

9. Hazard: A situation that may result in death or injury to persons or in damage to property. Includes effects of toxicity, fire, explosion, shock, concussion, fragmentation and corrosion.

10. Hazard Analysis: In this context, use of a simplified vapor dispersion model which looks at the movement of toxic or explosive vapors over distance at a concentration level of concern to determine whether the amount of chemical at a facility or in a transport container poses a threat to the surrounding community, requiring more detailed analysis and planning.

11. Hazardous Materials: Chemicals that are explosive, flammable, poisonous, corrosive, reactive, or radioactive and require special care in handling because of the hazards they pose to public health and the environment.

12. NCP: The National Contingency Plan establishes the structure by which the

federal government responses to episodic air toxic release events.

13. Off-site: The area outside the boundary of the on-site area that may be affected by the consequences of an extraordinary situation.

14. On-scene: The total area that may be impacted by the effects of an extraordinary situation. The on-scene area is divided into mutually exclusive on-site and off-site areas.

15. On-scene Command Post: Facility at a safe distance from an accident site, where the IC, responders and technical representatives can make response decisions, deploy manpower and equipment, maintain liaison with media and handle communications.

16. On-site: The area within the boundary established by the owner of a fixed facility.

17. Plume: A vapor cloud formation that has shape and buoyancy.

18. Response: The efforts to minimize the hazards created by an emergency by protecting the people, the environment, property and returning the scene to normal pre-emergency conditions.

19. Terrorist Activities: A violent act, or an act dangerous to human life, in violation of the criminal laws of the United States or of any State, to intimidate or coerce a government, the civilian population, or any segment thereof, in furtherance of political or social objectives.

20. Weapons of Mass Destruction: Any destructive device as defined in section 921 of 18 U.S.C., section 2332a, which reads: (1) any explosive, incendiary, or poison gas, bomb, grenade, rocket having a propellant charge of more than four ounces, missile having an explosive or incendiary charge of more than one quarter ounce, mine or device similar to the above; (2) poison gas; (3) any weapon involving a disease organism; or (4) any weapon that is designed to release radiation or radioactivity at a level dangerous to human life.

APPENDIX 2 TO ANNEX Q

PERSONAL PROTECTION OF CITIZENS

The following establishes policies and guidelines regarding the personal protection of citizens potentially affected by a hazardous materials incident. It includes the strategies of in-place sheltering and evacuation as well as relocation, water supply protection, and wastewater system protection

1. Sheltering In-place

   a. In some cases, advising people to stay indoors and to attempt to reduce the flow of air into a structure may be the most effective protective option. Emergency officials have used this strategy when it has been recognized that people could not be evacuated from an area prior to the arrival of a toxic chemical cloud.

   b. In order for an indoors protective strategy to be effective, planning and preparedness activities should provide:

      1) In-place sheltering or evacuation guidelines to be developed by the HFD for the purpose of determining when sheltering or evacuation is appropriate based on decision-making criteria such as the type of chemical, toxicity, duration, etc.

      2) A public information and notification system to warn and advise the public of immediate danger.

      3) A system for determining when a toxic chemical cloud has dissipated or cleared a particular area.

      4) Notification procedure for advising people to evacuate a building at an appropriate time.

      5) Public education on the value of indoor protection and on expedient means to reduce ventilation rates.

2. Evacuation

   a. Evacuation can be an effective means of protecting the public if it can be accomplished prior to the arrival of the toxic cloud at a particular location. The effectiveness of evacuation is dependent upon the time required to evacuate an area, and the size of the area compared to the time available before the cloud arrives.

   b. The responsibility for recommending an evacuation normally rests with the IC. The HPD working with HFD will carry out the evacuation. In situations where rapid evacuation is critical to the continued health and safety of the population, the IC may advise the public in the immediate vicinity to evacuate. OEM is to be notified when an evacuation is necessary. An OEM representative will coordinate with P&R the opening of a nearby Community Center(s) as a shelter for evacuees, if required.

   c. If the emergency warrants and the IC recommends evacuation, HPD officers will immediately initiate an evacuation. (Recommended evacuation distance

guidelines for specific hazardous materials are contained in the Emergency Response Guidebook). The IC will determine the routes of evacuation.

d. Ingress for incoming personnel must be identified, so as not to endanger their lives in the process of reporting to the incident site. Evacuation guidelines must be coordinated with liaison personnel at the on-scene ICP to ensure the safety of everyone.

e. If a state of disaster is declared, the EOC will be activated to coordinate the efforts of other county and municipal agencies and response personnel.

f. See Annex E (Evacuation) of the City's Emergency Management Plan.

3. Other Public Protection Strategies

a. Relocation: Some hazardous materials incidents may contaminate the soil, surfaces or water of an area and pose a lingering threat to people living there. It may be necessary for people to move out of the area for a substantial period of time until the area has been decontaminated or until natural microbiological degradation of the chemical has occurred with time.

b. Water Supply Protection: Surface and ground water supplies can be contaminated by a hazardous chemical spill or release. Recovery and restoration planning must provide for the quick identification of a threat of contamination to the drinking water supply and notification to the public and private water system operators, as well as warning of the public.

c. Wastewater and Stormwater Handling Systems: Hazardous chemicals entering stormwater and/or wastewater systems can cause serious and long term damage to the environment or to a water/wastewater treatment plant. If wastewater is diverted, it could create public health and environmental problems.

APPENDIX 3 TO ANNEX Q

CONTAINMENT AND CLEAN-UP

This Appendix provides for containment and clean-up operations and identifies resources available for clean-up and disposal.

1. Techniques for Spill Containment and Clean-up

   a. The responsibility for selecting and implementing the appropriate countermeasures is assigned to the IC in coordination with the State/Federal on-scene coordinator.

   b. The spiller is, by law, responsible for all clean-up counter-measures.

   c. The IC is responsible for monitoring the response activity to ensure that appropriate containment/displacement techniques are being initiated.

      Containment methods may include:

      1) Dikes
      2) Berms and drains
      3) Trenches
      4) Booms
      5) Barriers in soil
      6) Stream diversion
      7) Patching and plugging of containers or vessels
      8) Portable catch basins
      9) Over-packed drums or other forms of containerization
      10) Re-orientation of the container

   d. The IC, in the absence of a responsible party, may secure private contractors for displacement techniques. These may include:

      1) Hydraulic and mechanical dredging
      2) Excavating
      3) Skimming
      4) Pumping
      5) Dispersing/dilution
      6) Vacuuming

   e. Treatment of spilled hazardous substances can be physical, chemical or biological in nature. Treatment operations are the responsibility of the operator. Monitoring responsibility is assigned to the TCEQ, in accordance with the State of Texas Oil and Hazardous Substances Spill Contingency Plan.

f. Exposure Assessment: Initial assessment of the incident is the responsibility of the fixed facility. It should be recognized that industrial capability to assess the situation is supported by in-depth knowledge of the chemicals, facilities and the environment. The fixed facility is liable for damages resulting from a release and is motivated to provide timely and accurate assessment of each situation. Other assessment capability is available.

1) The HMRT has equipment to provide monitoring and assessment capability.

2) The TCEQ has an air toxic response program with personnel and equipment to sample suspected airborne toxic compounds.

g. Restoration

1) Treatment of contaminated soils and sediments is a responsibility of the owner of the property and/or the spiller.

2) When feasible, contaminated soils and sediments will be treated on the site. Technologies available include:

a) Incineration

b) Wet air oxidation

c) Solidification

d) Encapsulation

e) Solution mining (soil washing or soil flushing)

f) Neutralization/detoxification

g) Microbiological degradation

4) Off-site transportation or storage, treatment, destruction, or secure disposition off-site may be provided in cases where State/Federal On-Scene Coordinator(s) determines such actions:

a) Are most cost effective

b) Will create increased capacity to manage

c) Are necessary to protect public health, welfare or the environment

5) Contaminated soils and sediments may be removed from the site. Technologies used to remove contaminated sediments from soils include:

a) Excavation

b) Hydraulic Dredging

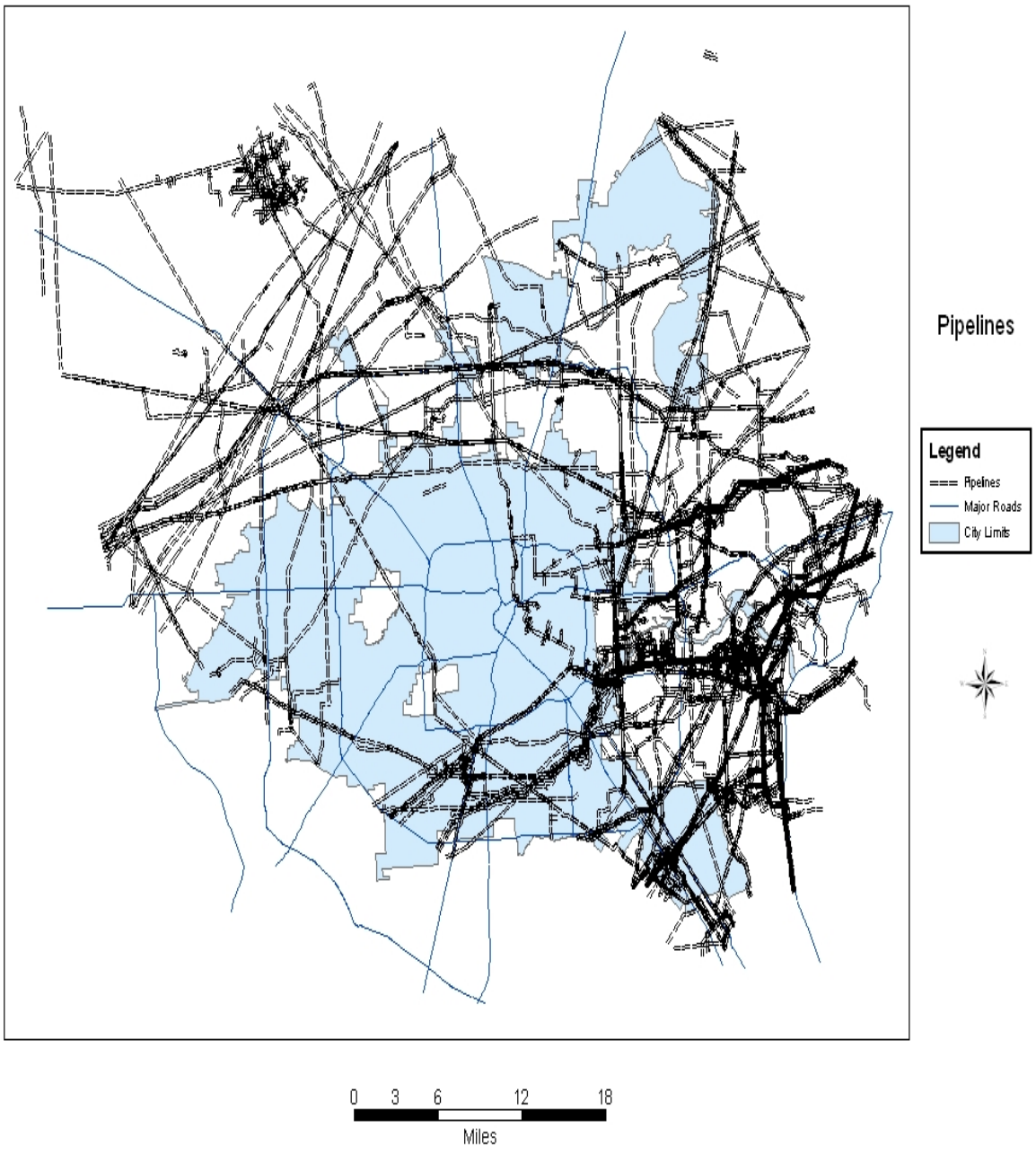
c) Mechanical Dredging

6) Provision of alternative water supplies can be provided in several ways:

a) Individual treatment units
b) Water distribution system
c) New wells or deeper wells
d) Cisterns
e) Bottled water
f) Trucked-in water

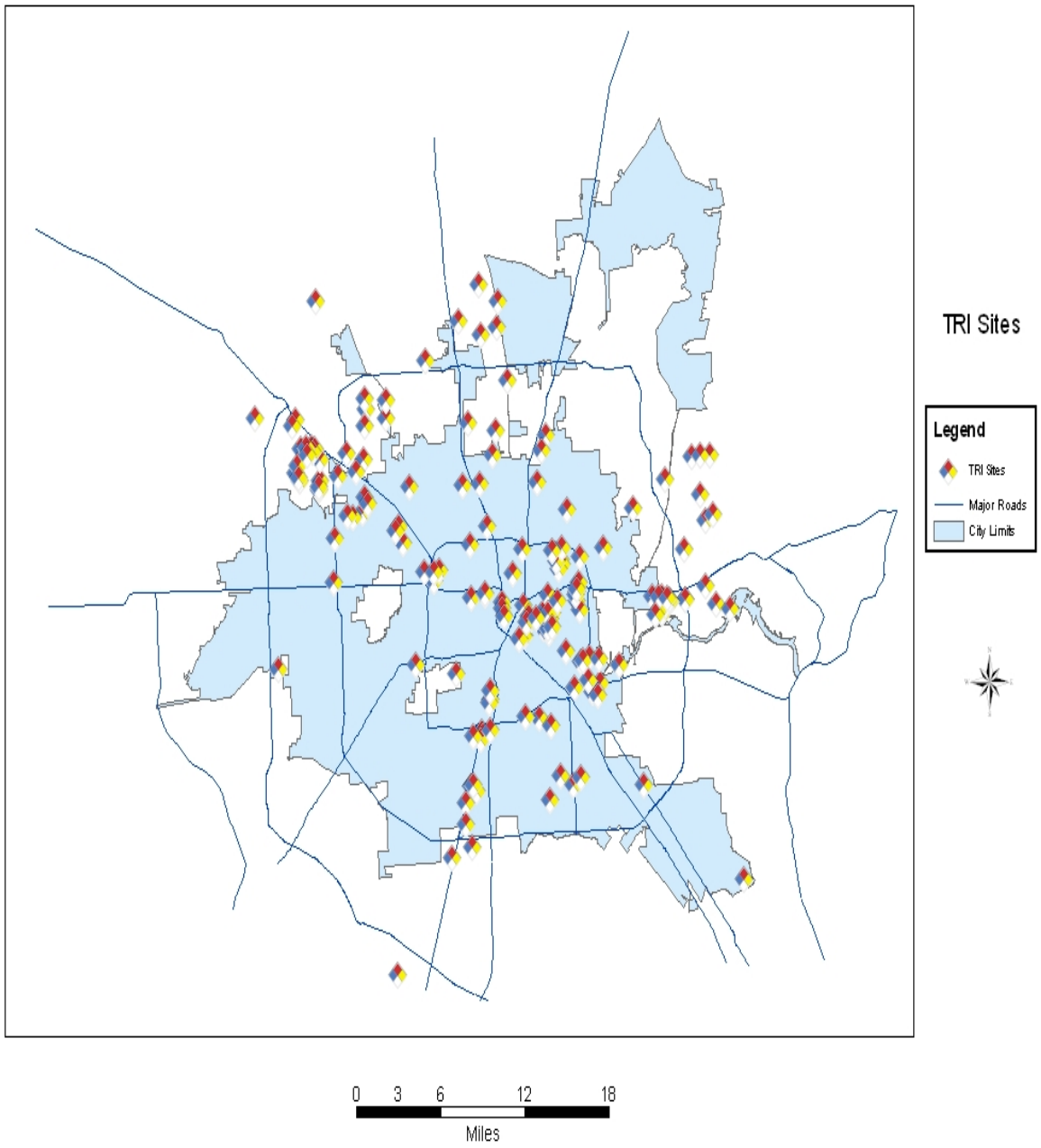
APPENDIX 4 TO ANNEX Q

REGULATED FACILITIES



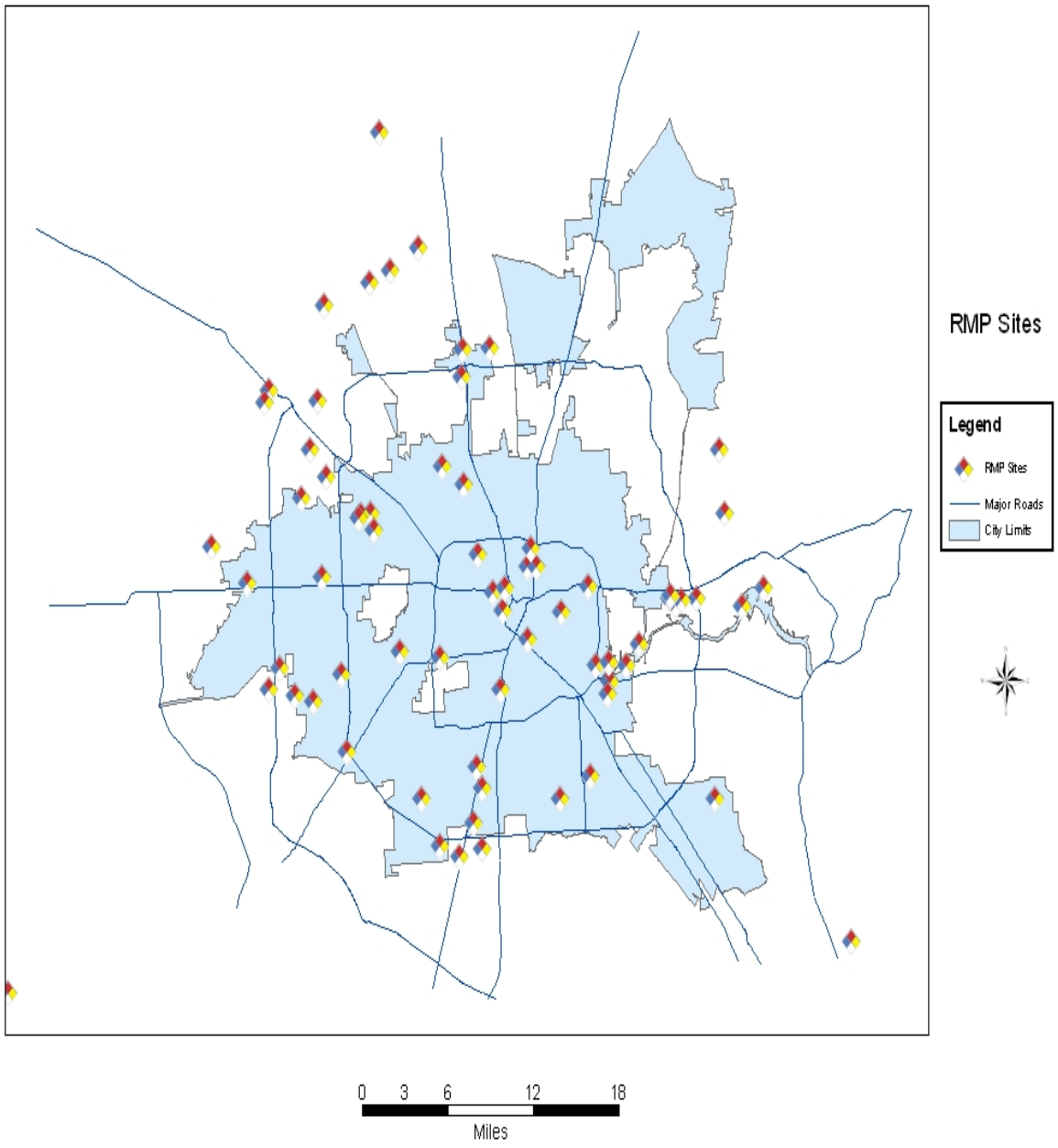
APPENDIX 4 TO ANNEX Q

REGULATED FACILITIES



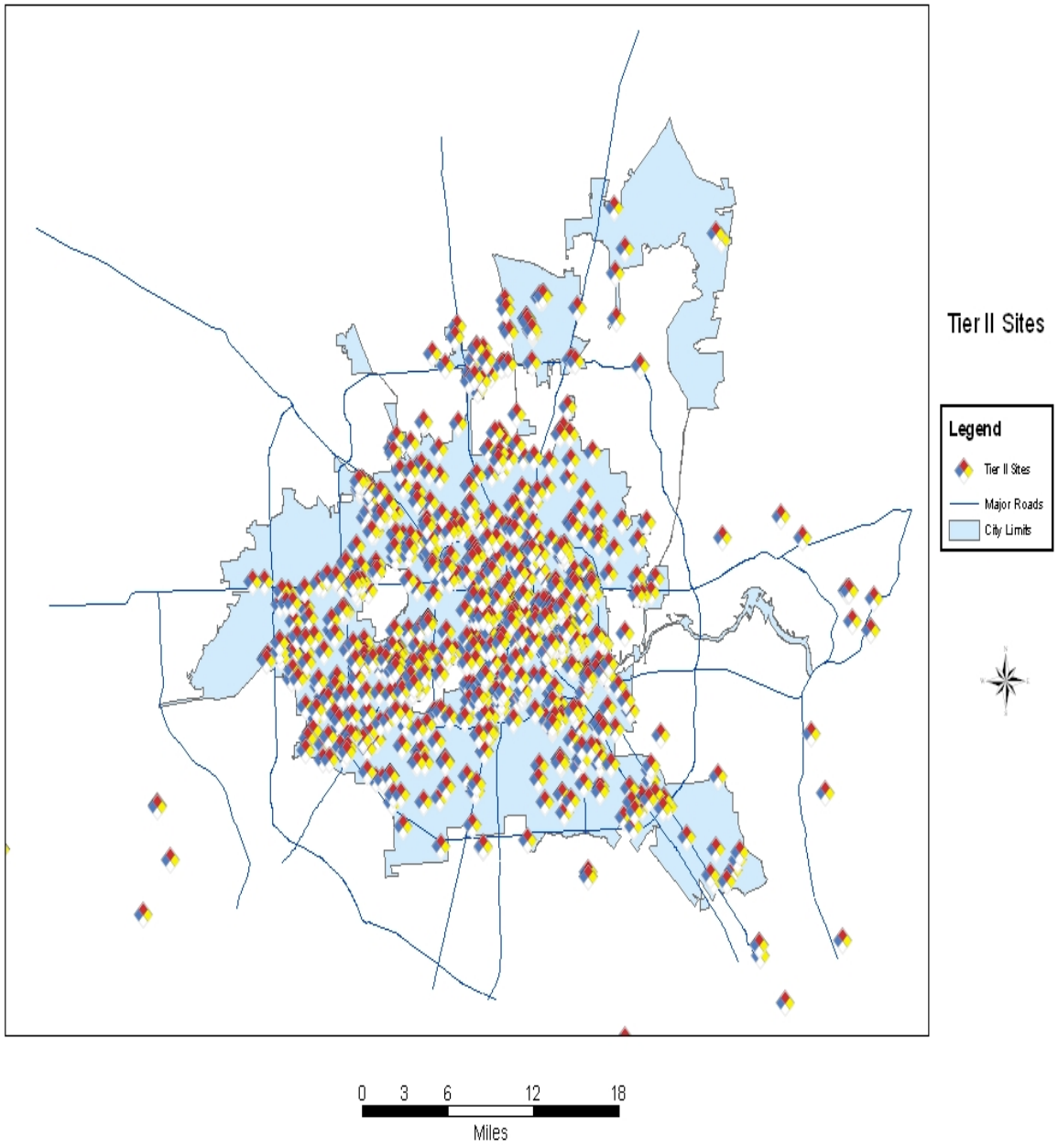
APPENDIX 4 TO ANNEX Q

REGULATED FACILITIES



APPENDIX 4 TO ANNEX Q

REGULATED FACILITIES



APPENDIX 5 TO ANNEX Q
TRANSPORTATION ROUTES

APPENDIX 5 TO ANNEX Q

TRANSPORTATION ROUTES